Chapter VII

LAND CLASSIFICATION

One of the most important prerequisites for a rational land-use planning is the land classification. It is an exercise for interpretative grouping and grading of soils according to their potentialities and limitations. It gives a detailed information about the productivity of various types of land. Therefore, the importance of land classification into various types, based on the physical and chemical qualities and intensity of its use, hardly needs any elaboration in the studies of land-use. The village accounts and revenue reports provide some vital information regarding the crop-fields and settlement areas. These have earlier been classified on the basis of traditional surface observation, into upland (Atongba or Tumai), level plain (Phaurel-Laupham), low-lying (Akutpalaupham or Tauthabi), and homestead land (Enkhol). The present land classification is rather sketchy, and as such, is of little significance for the present study. Moreover, this is mainly for the revenue assessment purposes and does not take the physical and chemical properties of the soil into account. The physical factors like relief structure, drainage, slope and climate, which besides soils, affect the fertility and productivity of land have not been considered and are, therefore, not of much use for this study.
The fertility of soil varies from place to place mainly according to physical factors regulating the air and water of the soil and the growth of plants and the bacterial life. The productivity and fertility of soil are also influenced by the prevailing climate, particularly rainfall, might render even the soil of high fertility rather unproductive. Adequate rainfall could bring out a good harvest in spite of poor soil conditions. Different categories of soil may fall under the same class of agricultural land-use. But the pattern of use varies according to the climate altitude and surface condition. The conditions mainly responsible for limiting agricultural production are susceptibility to top-soil erosion, degree of slope, depth of soil, nature of sub-soil, chemical composition of soil, depth of underground water table, water-logging and climatic hazards, etc. A land with lesser limitations and a greater capacity to grow a large variety of crops with better yields, will naturally qualify to be grouped in a better class than other lands with lower performance under the same management practices.

The yield of crop in a field represents the true agricultural productivity of land and is an index of potentiality of field as it represents not only the natural fertility of the soil and the prevalent climatic conditions but also is the result of the efficiency of the farming system and farming
community. Considering these points the classification of land of the Manipur Valley has been done on the basis of fertility and productivity into the following three classes:

1. Good Quality Land (A)
2. Medium Quality Land (B₁) and (B₂).
3. Poor Quality Land (C).

The good quality lands include all the paddy fields with loamy and well drained soil, suitable for double and multiple cropping. The soils of this type of lands are generally deficient in nitrogen and humus content. It occasionally contains large proportions of phosphorous and potash. The pH value of the soils of these areas ranges from 5 to 6.5. The productivity of these lands can further be increased considerably with proper care. Both rabi and kharif crops can be grown well in these lands, which cover 57,673.104 hectares or 71 per cent of the total cultivated area of the valley. About 22,157 hectares or more than 38 per cent of this good quality land (A) is under the Thoubal Sub-division, while 18,566.02 hectares or 32.1 per cent is in the Imphal West Sub-division. It is followed by the Imphal East and the Bishenpur Sub-divisions with 17,002.826 hectares or 29 per cent and 132.201 hectares or 0.2 per cent respectively. The average yield of this type of land is 4,800 kg/hectare (paddy).

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At present only 5.9 per cent of the good quality land is under double cropping.

The medium quality land can be classified into two groups, i.e. $B_1$ and $B_2$ types of land. Both these types are less productive than the type A. The $B_1$ land covers an area of about 12,134 hectares or 15 per cent of the total cultivated area of the valley and ranges from loamy to loamy-sand in texture with pH value between 6 and 6.2. It contains 1.67 per cent to 2.92 per cent of organic carbon. The average potash content per hectare ranges from 2.24 kg to 2.80 kg. The lands with this type of soil is generally used for growing paddy by broadcasting, in combination with a variety of pulses (matikolai). Sometimes such lands are used for maize and sugar-cane cultivation. The proportion of this kind of land to the total varies from one administrative sub-division to another. In Thoubal Sub-division it covers more than 5,599,919 hectares or 45 per cent of the total $B_1$ type of land of the valley. It is followed by the Ishpal East (3,639,6598 hectares or 29.9 per cent), Ishpal West (15.6 per cent) and the Bishenpur (10.3 per cent).

The soils of $B_2$ land are clayey loam to clay. These soils have a pH value from 4.6 to 5.5 with more than 1.25 per cent of organic carbon. The average potash content varies from 1.12 to 1.68 kg/hectare. This type of land is found near the lakes, and swamps. Owing to its higher moisture retaining
capacity, or its liability to become water-logged during the rainy season, this type of land is not favourable for profitable cultivation. It is entirely devoted to transplantation of local variety of water resistant paddy like 'Taouthabi' and 'Eroiya'. Such kind of land covers 11,414.263 hectares or 14 per cent of the total cultivated area of the valley. The bulk of the area of this type of land lies in the sub-divisions of Imphal West (5,136.419 hectares or 45 per cent) and the Bishenpur (2,625.281 hectares or 23 per cent) bordering the Loktak Lake, followed by the Imphal East (21 per cent) and the Thoubal (11 per cent) sub-divisions.

The poor quality ('C' category) lands covering 99,252.71 hectares or 37.5 per cent of the total valley are normally left unutilized owing to its poor fertility, steep slope and higher degree of erosion. The pH value of their soils ranges from 4.5 to 4.8 with 0.75 per cent to 1.25 per cent of organic carbon. The average potash content of the soils is 1.68 kg/hectare. These lands include permanent pastures (1,908.67 hectares), foot-hills (86,185.04 hectare) and isolated barren hillocks (11,139 hectare). These lands are mostly covered with stunted bushes and shrubs used for grazing.

**Potential Production Unit:**

The above land classification of the Manipur Valley indicates only the existing productivity of the land and does not
give any concrete idea about its varying potentiality. In order to assess the productive capacity of each type, the technique used in 'Potential Production Unit' (P.P.U.) can be applied. For an assessment of the comparative productivity of different types of land, the average yield of food grain per unit area of arable land used for food crop is taken as the standard constituting one P.P.U. The ratio of yield from other types of land is then obtained and finally the value is ascertained in terms of P.P.U. For example, if the average yield of 1,000 kg per hectare in a particular area is represented by one P.P.U., the yield of 2,000 kg per hectare in good quality land and 500 kg per hectare in poor quality land, and will be rated as 2 P.P.U. and 0.5 P.P.U., respectively.

Based on this concept, the productivity rate of the Valley has been projected from the village level data. The productivity rate for each type of land has been worked out on the basis of the average yield of good farm land. The product of the actual area (in hectare) occupied by each type of land

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2 For an exposition of the concept of P.P.U. reference may be made to:


ii) *idem*, The Under-Developed Land of Britain, 1954.


3 loc. cit.
The rate figure gives the number of P.P.U. 's. The following table (7:1) gives the productivity ratings as well as the actual area and its corresponding production in terms of potential production units.

**Table 7:1**

Manipur Valley

Potential Production Unit Rating of the Agricultural Land

(1977-78 and 1979)

(One unit of P.P.U. is equivalent to 2,669 kg of paddy grain/hect.)

<table>
<thead>
<tr>
<th>Type of Land</th>
<th>Area in Hectare</th>
<th>Average Yield Per Hectare</th>
<th>Productivity Rating Per Hectare</th>
<th>Number of P.P.U.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good quality land (A)</td>
<td>73,878.104</td>
<td>4,619</td>
<td>1.6</td>
<td>1,18,204.96</td>
</tr>
<tr>
<td>Medium quality land (B1)</td>
<td>12,154.692</td>
<td>1,679.5</td>
<td>0.58</td>
<td>7,049.72</td>
</tr>
<tr>
<td>Medium quality land (B2)</td>
<td>11,416.265</td>
<td>2,509.5</td>
<td>0.80</td>
<td>9,131.412</td>
</tr>
<tr>
<td>Poor quality land (C)</td>
<td>99,292.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,50,186.77</td>
<td></td>
<td></td>
<td>1,34,386.09</td>
</tr>
</tbody>
</table>

It is observed from the above table that at the existing level of technological development about 1,50,186.77 hectares of

4 Noor Mohammad, *Agricultural Land-Use in India*, Delhi, 1977, p.93.
the cultivable land (with the exception of lands not available for cultivation), is equivalent to 1,34,386.09 hectares of good quality (A) type land. A relatively higher P.P.U's is the result of the existence of a part of the good quality land under double cropping.

One hectare of medium quality B1 land (which covers about 12,154.692 hectares) is equal to 0.58 hectare of good quality land. It thus, amounts to 7,049.72 P.P.U's. The productivity rating of B2 land is 0.80 and, therefore, about 11,414.265 hectares of B2 lands are potentially equal to only 9,131,412 hectares of good quality land. There is still scope for increasing the total number of P.P.U's. Thus, increase in productivity may be achieved by focussing attention on 'B' category of land which can produce two crops in a year, provided that sufficient amount of manure, fertilizer, proper irrigation facilities, and modern techniques of farming are applied. Moreover, there are about 99,232.71 hectares of 'C' type of land in the valley, which does not produce anything now. Out of this, more than 88,093.71 hectares can be reclaimed. A better economic condition and a higher knowledge of technology among the peasants might enhance the land-use capacity of the area.

In order to understand the problems of land-use it is necessary to classify the land of the valley on the basis of limitation factors. The lands of the Manipur Valley have been
divided into two main classes with the application of the techniques of the 'All India Soil and Land-use Survey Organization, IARI, 1974. These are: (a) lands suitable for agriculture and (b) those with less agricultural value. However, these types are modified according to the local conditions. Thus each category has been further divided into four sub-classes (Map 26):

(a) Land Suitable for Agriculture:

Class I (Acid): This group consists of the land of good productivity, that is practically free from erosion and suitable for cultivation without special care. It covers only 24,300 hectares or 9.2 per cent of the total area of the valley. Its largest concentration is in the middle of the valley with small and scattered parts lying towards the east. This type of land is distributed on the interfluvies of the Namboin, Imphal, Iril and the Thoubal rivers. More than 9,900 hectares or 40 per cent of its area lies under the Sub-Division of Imphal West, followed by Sub-Divisions of Imphal East (7,200 hectares or 29.6 per cent), Thoubal (6,300 hectares or 25.9 per cent) and Bishenkpur (1,00 hectares or 4.5 per cent) respectively. The area consists of very deep (more than one metre), fertile and well drained silty-loam which lie generally on loam to silty loam sub-soil. Slope on such land ranges from 0 to 1 per cent and the pH value of the soils varies from 6 to 6.5. This type of land is suitable for the crop like paddy, wheat, maize, mustard, cabbage, sugar-cane, etc.
Class II ($\beta_{12}$): This class of land comprises an area of about 56,450 hectares, i.e. 21.4 per cent of the total area of the valley. It covers the whole of the north and north-eastern parts bordering the foot-hill zone. The largest proportion of this type of land is under the Thoubal Sub-Division, covering about 32,120.09 hectares or 56.9 per cent, followed by the Imphal West Sub-Division (12,588.35 hectares or 22.5 per cent). The rest area of this type of land distributed among the Sub-Divisions of Imphal East (8,975.55 hectares or 15.9 per cent) and Bishenpur (2,766.05 hectares or 4.9 per cent) respectively. The productivity of this type of land is moderate to good. It can be worked even by traditional methods and get a reasonable yield. This type of land represents high ground and river banks. Gradient of it ranges from 1 to 3 per cent. The soils are loam to loamy sand. The water holding capacity of its soils is moderate to low. The fertility is low and a balanced use of the fertilizers is essential for better harvest. Adequately irrigated, such a land can be successfully cropped, provided water supply is assured. This type of land is suitable for paddy, wheat, mustard, pea, cabbage, tomato, etc.

Class III ($\beta_{13}$): The land of this category has almost the same characteristics as those of the class II, except that it is affected by erosion. This type of land occupies only 17,100 hectares of land, i.e. 6.5 per cent of the total geographical area
of the valley. They are concentrated only in the southern portion of the valley, bordering the southern foot-hill areas. The highest proportion of this type of land is found in the Bishenpur Sub-Division, occupying 12,500 hectares or 73.1 per cent of the total area of it, while 4,600 hectares or (26.9 per cent) is found in the Thoubal Sub-Division. The soils are very deep, friable and moderately well drained loam generally lying on the loam to sandy-loam sub-soils. The fertility status is low. The crops that can profitably be grown are arhar, maize, paddy, wheat, mustard, pea, cabbage, chilli, sugar-cane, etc. For the optimum utilization of this type of land the measures suggested in the case of class II may be adopted.

Class IV (Meso): The soils of this type of land are clay-loam to clayey. The areas around the lakes and swamps are mainly dominated by this type of land. Owing to their higher moisture retaining capacity, they are liable to become water-logged during the rainy season due to their proximity to the lakes and swamps. The land is almost level like class I, but not properly drained. The limitation of it is that it is often subject to over flooding. The soils remain submerged for 6 to 7 months of the year. As a result, most of this land has been lying unused. It covers an area of about 21,600 hectares or about 8.2 per cent of the total geographical area of the valley. This land is suitable for the cultivation of water resistant paddy, such as taushabi, aroiya, etc. It is also suitable for very early and late varieties of
suggested for proper use of this type of land: (a) occasional cultivation with pastures or orchards with a permanent cover crop for protection, (b) raising of guava, jack-fruit, mango, coffee, etc., (c) adoption of intensive soil conservation practices to control soil erosion, (d) frequent irrigation at short intervals with check basins, graded borders and furrow method.

**Class VI (B₂g₂)**: This type of land covers the foot-hill zones of the Manipur Valley. The soils of this class are similar in character as those of type V, except that limitations caused by excessive erosion and lack of water facilities are extremely severe. It is a stony type of soil with sandy and silty loam lying on silty loam to loamy sand sub-soils. The stoniness of the soil increases towards the hills. It occupies 1,07,321 hectares or 40.7 per cent of the valley. The Imphal East Sub-Division covers the highest proportion of area under this type of land with about 41,400 hectares or 38.5 per cent, followed by the Thoubal Sub-Division (29,700 hectares or 27.6 per cent). The remainder is distributed in the Bishenpur (22,900 hectare or 21.3 per cent) and Imphal West (13,500 hectare or 12.6 per cent) Sub-Divisions. It is frequently exposed to the various agents of the soil erosion and weathering. The slope on this type of land is 5 per cent and above. The depth of the soil is limited. The fertility status is very low with pH value varying between 5 and 6. However, the area is suitable for cultivation of maize,
turmeric, ginger, sweet-potato, potato, citrus fruits, sugar-cane, etc. It is also suitable for crops like pine-apples, jack-fruits, mango, coffee and tea, etc. The area requires higher input cost for levelling or terracing operations. But since acute soil wash and low water holding capacity are serious phenomena of this area, these measures are necessary. The sloping topography, inherent low fertility and low moisture holding capacity are the main limitations of this land.

Following management practices are suggested for planning the use of this type of land: (a) adoption of intensive soil conservation methods to control the soil erosion while in cultivation, (b) adoption of contour trench plantation method, (c) construction of bench terraces which is the most economical way of levelling the land for agricultural use, and (d) raising crops with quick growing tree plants. These practices could help in an economic utilization of this type of land so far lying unused.

Class VII: This type of land represents the barren isolated hillocks. It covers an area of about 11,139 hectares or 4.3 per cent of the valley. Slopes of these hillocks are very steep. Thus, the top-soils are frequently washed out by weathering, resulting in the exposure of bare rocks. These areas lie barren all the year round. The pH value of its soils is 4.5 to 5. These areas may be suitable for horticultural practices.
Class VIII : The area covered by permanent water bodies belongs to this class. It covers an area of about 23,595.5 hectares, 8.9 per cent of the total geographical area of the valley. Agriculturally this area is not of any significance. However, it can be used for the purpose of tourism and pisciculture.